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AD 87 2494



AD

FSN 4120-930-5700
USATECOM PROJECT NO. 7-EG-175-018-003
REPORT NO. APG-MT-3592
TEST SPONSOR PROJECT NO. NOT AVAILABLE
USACDC AC NO. NOT AVAILABLE

INITIAL PRODUCTION TEST OF
AIR CONDITIONER, TRAILER MOUNTED,
18,000 BTU/HR, ELECTRIC MOTOR
DRIVEN, 50/60-CYCLE
120/208-VOLT, 3-PHASE

FINAL REPORT

BY

ROBERT O. RICE

JUNE 1970

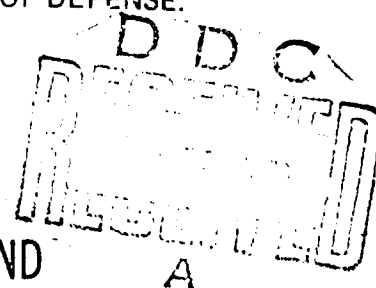
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DEPARTMENT OF THE ARMY
HEADQUARTERS, U. S. ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND, MARYLAND 21005

AMSTE-GE

15 JUL 1970

SUBJECT: Final Report on Initial Production Test of Air Conditioner,
Trailer-Mounted, 18,000 BTU/HR, Electric-Motor-Driven, 50/60-
Cycle, 120/208^{1/2} Volt, 3-Phase, USATECOM Project No. 7-EG-175-
018-003

Commanding General
U. S. Army Mobility Equipment Command
ATTN: AMSME-QRT
4300 Goodfellow Boulevard
St. Louis, Missouri 63120

1. Reference letter, AMSME-QRT, USAMECOM, 10 April 1970, subject: Air Conditioner, 18,000 BTU/HR, Trailer-Mounted, USATECOM Project No. 7-EG-175-018-003.
2. Subject final report is approved and forwarded for information.
3. The subject test was initiated on 16 January 1970 and terminated on 22 April 1970 at the request of USAMECOM (reference letter). The USAMECOM letter states the requirement for a trailer-mounted 18,000 BTU air conditioner has been exceeded by shipments to the RVN theater. The test units will be returned to the Granite City Army Depot, disassembled, and reconfigured into five stack assemblies.
4. The results of tests completed prior to termination disclosed two deficiencies, six shortcomings, and one random failure. Since the subject test project was not completed, a suitability for release of the test item has not been provided.

FOR THE COMMANDER:

1 Incl
Final Report (3 cys)

Quellen D. Boller
QUELLEN D. BOLLER
Colonel, GS
Dir, GE Mat Test Dir

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separated from inclosures.

AMSTE-GE

15 JUL 1970

SUBJECT: Final Report on Initial Production Test of Air Conditioner,
Trailer-Mounted, 18,000 BTU/HR, Electric-Motor-Driven, 50/60-
Cycle, 120/208 Volt, 3-Phase, USATECOM Project No. 7-EG-175-
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FSN 4120-930-5700

USATECOM PROJECT NO. 7-EG-175-018-003

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ROBERT O. RICE

JUNE 1970

ABERDEEN PROVING GROUND
ABERDEEN PROVING GROUND, MARYLAND
21005

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ABSTRACT

The initial production test of the 18,000 British thermal units per hour trailer mounted air conditioner was conducted at Aberdeen Proving Ground, Maryland, from 16 January through 22 April 1970 to determine the ability of the test items to withstand environmental, transportation, durability, capacity, and radio interference suppression tests. The test was terminated by the United States Army Test and Evaluation Command before all testing was completed. The tests started or completed before termination were the initial inspection and servicing test; the control and performance test; the refrigerant pressure and leak test; the high temperature storage and operational test; the durability, maintainability and reliability test; and the radio interference suppression test. The results on the completed tests showed two deficiencies, six shortcomings, and one random failure. One deficiency was that one of the units was received without a fire extinguisher. The other deficiency was a failure to start due to the failure of the code A magneto. The shortcomings were: the excessive vibration of the units, the inadequate range of two thermostats, the improperly-adjusted high-pressure cutout switch, the improper engine technical manuals received with the units, missing fasteners, and the failure of one generator frequency converter. The random failure was the failure of an engine governor.

FOREWORD

Materiel Testing Directorate was responsible for conducting the tests and preparing the report.

ABERDEEN PROVING GROUND
ABERDEEN PROVING GROUND, MARYLAND 21005

USATECOM PROJECT NO. 7-EG-175-018-003

FINAL REPORT ON INITIAL PRODUCTION TEST OF
AIR CONDITIONER, TRAILER MOUNTED,
18,000 BTU/HR, ELECTRIC MOTOR
DRIVEN, 50/60-CYCLE,
120/208-VOLT, 3-PHASE

16 JANUARY THROUGH 22 APRIL 1970

SECTION 1. SUMMARY

1.1 BACKGROUND

The test items were procured under contract DAAG11-68-C-1487. The applicable test documents are MIL-A-52568A(ME), 3 January 1968, and MIL-A-11210E, 18 August 1966. An engineering design test (Reference 2) and a product improvement test (Reference 3) were completed on these units by USATECOM in November 1966 and March 1969 respectively. The authorization for this test is given in Appendix III.

1.2 DESCRIPTION OF MATERIEL

The air conditioners have the following characteristics:

- a. Mechanical. Multipackaged, trailer mounted, 18,000 Btu per hr, 800 cfm, electric motor driven, with flexible ducts, and duct retainer rack.
- b. Electrical. Drive motor, 50 to 60-Hz, 120 to 208-volts, 3-phase, powered by military design generator set, 5-kw, 60-Hz, GED, mounted on the same trailer.

1.3 TEST OBJECTIVES

The over-all objectives of the subject test are:

- a. To determine if the subject air conditioner conforms to the purchase requirements.
- b. To determine if it is suitable for issue for Army use under the intent of AMCR 700-34, 3 April 1967.

1.4 SCOPE

The 18,000 Btu per hour, TRL MTD, EMD air conditioner was tested by the Materiel Testing Directorate at Aberdeen Proving Ground. The testing was terminated by USATECOM (ref III-7) after three months of testing had been completed. The tests were being conducted on these units to determine compliance with requirements for use with the following systems:

- a. AN/GRC-26 Radio Set.
- b. AN/MCC-6 Telegraph, Telephone Terminal.
- c. AN/MSO-29 Terminal, Telegraph Repair Shop.
- d. Repair Shop, Instrument Repair Shop, Truck Mounted.
- e. AN/MRC-29 Radio Relay Terminal Set.

The allocation of the units to the various tests and the sequence of testing are given in Table 1.4-1.

Table 1.4-1. Test Sequence

| Air Conditioner Serial No. | Test Sequence | | | | | |
|-------------------------------------|---|---|--|---|---------------------------------------|------------|
| | | | | | | |
| 69301 | ^a Initial inspection and servicing test. | ^a Controls and performance test. | ^a Durability, maintainability and reliability test. | | | |
| 69302 | ^a Initial inspection and servicing test. | ^a Controls and performance test. | Cooling capacity and air flow test. | Refrigerant moisture content test. | Humidity test. | |
| 69303 | ^a Initial inspection and servicing test. | ^a Controls and performance test. | ^a Refrigerant pressure and leak test. | ^a High temperature storage and operational test. | ^a Radio interference test. | Road test. |

^aTests started or completed before test termination.

1.5 SUMMARY OF RESULTS

The following results were recorded.

- a. Initial Inspection and Servicing Test. All three units were received with the improper technical manual for the gasoline engine on the 5-kw generator. One unit was received without a fire extinguisher, and two units were missing fasteners (par. 2.1.4).
- b. Controls and Performance Test. The thermostat ranges recorded were 62°F through 91°F, 60.5°F through 91°F, and 64°F through 94°F on the units which should have a range of 60°F through 90°F. The high-pressure cutout switch on one unit functioned at 250 psig until properly adjusted to 280 psig. All other controls functioned as specified (par. 2.2.4).
- c. Refrigerant Pressure and Leak Test. No significant leaks were recorded (par. 2.3.4).
- d. High Temperature Storage and Operational Test. No defects were recorded as a result of the high temperature storage at +155°F, and the unit operated satisfactorily at +120°F (par. 2.4.4).
- e. Durability, Maintainability and Reliability Test. The air conditioner operated for 1120 hours with one mission-aborting failure before the test was terminated (par. 1.4). These hours of operation were insufficient to make a determination as to the degree to which the unit met the criteria (par. 2.5.4).
- f. Radio Interference Suppression Test. The air conditioner operated within the allowable limits of MIL-STD-461A, Table A-1, Subtest ACE-2 and REO-2 (par. 2.6.4).

1.6 CONCLUSIONS

It was concluded that:

- a. The air conditioner met all the requirements of the high temperature storage and operational test (par. 2.4), the refrigerant pressure and leak test (par. 2.3), and the radio interference suppression test (par. 2.6).
- b. The air conditioner failed to meet all the criteria of the initial inspection and servicing test (par. 2.1), the controls and performance test (par. 2.2), and the durability, maintainability and reliability test (par. 2.5).

1.7 RECOMMENDATIONS

None.

SECTION 2. DETAILS OF TEST

2.1 INITIAL INSPECTION AND SERVICING TEST

2.1.1 Objective

The objective was to determine if the unit as received was properly assembled and complete with all on-board equipment.

2.1.2 Criteria

The criteria are:

- a. The trailer chassis shall have the following equipment on-board:
 - 1) Generator set, 5 kw, with operator and maintenance manual.
 - 2) Air conditioner with operator and maintenance manual.
 - 3) Two each flexible ducts 15-feet long by 12-inches in diameter.
 - 4) Rack for duct storage.
 - 5) Fire extinguisher.
 - 6) Ground rod and ground wire.
 - 7) Canvas cover for the generator set.
- b. The on-board equipment shall be properly mounted and all hardware tightened.

2.1.3 Method

The unit was examined for completeness of items and also to insure all components were properly secured. Any defects were noted and corrected. The generator set was serviced in accordance with instructions found in the maintenance literature.

The air conditioner was connected to the generator set for 120 to 208 volt, 3-phase, 4-wire operation. The assembly was grounded and the generator set started. The air conditioner was energized and checked for proper phasing (correct rotation of evaporator fan in the ventilate mode).

2.1.4 Results

The results were as follows:

- a. Results of the inspection for the on-board equipment were as follows:
 - 1) Generator set, 5-kw, with operator and maintenance manual. The gasoline engine technical manuals received with all three units (TM-5-2805-204-14) were for Model 2A042-II and Model 4A084-II. The gasoline engine on the 5-kw generators received was Model 4A042-III. All other generator equipment was received on-board.
 - 2) Air conditioner with operator and maintenance manual. Received on-board.
 - 3) Two each flexible ducts 15-feet long by 12-inches in diameter. Received on-board.
 - 4) Rack for duct storage. Received on-board.
 - 5) Fire extinguisher. One unit (SN69302) was received without a fire extinguisher.
 - 6) Ground rod and ground wire. Received on-board.
 - 7) Canvas cover for the generator set. Received on-board.
- b. Results of the inspection for properly mounted on-board equipment and properly tightened hardware were as follows:
 - 1) One unit (SN69301) was received with one panel fastener missing on one of the duct adapters.
 - 2) One unit (SN69303) was received missing the bolt and nut that connect the fender and storage box.
 - 3) All other equipment was properly mounted and tightened.
- c. The generators and the air conditioners operated satisfactorily.

2.1.5 Analysis

The air conditioner failed to meet the criteria of the initial inspection and servicing test.

One unit was received without a fire extinguisher. This was considered a deficiency because it was a safety hazard. All three units were received with the improper gasoline engine maintenance manual, and two units were received missing fasteners. These incidents were

considered shortcomings because the units were still operational, but the failures would have to be corrected to increase the efficiency and to render the equipment completely serviceable.

2.2 CONTROLS AND PERFORMANCE TEST

2.2.1 Objective

The objective was to determine if the air conditioner had the required controls and that they functioned as required.

2.2.2 Criteria

The criteria are:

- a. A removable control panel will be located on the condenser blower section and shall contain the following:
 - 1) Selector switch - a four-position (Off, Ventilate, Cooling and External Control) switch.
 - 2) A variable thermostat with a range of +60°F, or less, to 90°F, or more, to control cycling of the condenser blower and the compressor.
- b. A high-pressure cutout switch shall be provided in the compressor discharge line to turn the compressor and condenser fan off when the condenser pressure reaches 280 psig. The switch shall have a reset switch located at the rear of the compressor section.
- c. The temperature differential of the evaporator discharge and return air temperature when measured at the end of the ducts shall not be less than 12°F.

2.2.3 Method

With power applied to the air conditioner and the selector switch set in the Cool position, the evaporator fan was observed to note if it operated immediately. The thermostat was adjusted for maximum cooling to determine if the condenser fan motor started and, after a short delay, the compressor started. The range of the thermostat was determined by removing the thermostat bulb from the air stream and immersing it in water at 60°F. It was then determined if the unit operated in the cooling mode when the thermostat was adjusted for maximum cooling. The thermostat was adjusted for minimum cooling and the test was repeated with the water temperature at 90°F. The high-pressure cutout was evaluated by connecting pressure gages to the unit and operating the unit in the cooling mode. The condenser air flow was restricted and the discharge pressure monitored for activation of the cutout when the pressure reached 280 psig. The condenser air restriction was removed to

determine if the reset switch functioned. The ducts were connected to the unit and the thermostat set to maximum cooling position, and with appropriate instruments, the temperature differential of the evaporator discharge and return air temperature was measured. The measurement was made at the end of the ducts.

2.2.4 Results

The units had a removable control panel with a four-position selector switch and thermostat. The unit did have a high-pressure cutout reset switch located at the rear of the compressor location. The results of the performance test are given in Table 2.2-1.

Table 2.2-1. Functional Test Data at Ambient Conditions

| Condition | Air Conditioner | | |
|--|-----------------|-----------------------|---------|
| | SN69301 | SN69302 | SN69303 |
| Ambient temperature, °F | 70 | 77 | 78 |
| Selector switch - cool and | | | |
| Thermostat - max cool | | | |
| Evaporator fan operate immediately | Yes | Yes | Yes |
| Condenser fan motor operate | Yes | Yes | Yes |
| Compressor operate | Yes | Yes | Yes |
| Thermostat range, °F | 62-91 | 60.5-91 | 64-94 |
| High-pressure cut out actuation, psig | 275 | ^a 250, 280 | 275 |
| Temperature differential between evaporator return and discharge air, °F | 20 | 20 | 22 |

^aAfter adjusting the high-pressure cut out switch.

2.2.5 Analysis

The air conditioner failed to meet the criteria of the controls and performance test.

Two units failed to have an adequate thermostat range and one unit failed to have the high-pressure cutout properly adjusted. These incidents were considered shortcomings because the units were still operational, but the failures would have to be corrected to increase the efficiency and to render the equipment completely serviceable.

2.3 REFRIGERANT PRESSURE AND LEAK TEST

2.3.1 Objective

The objective was to determine if the refrigerant system components and lines had been assembled properly and had no leaks large enough to appreciably reduce the refrigerant charge.

2.3.2 Criterion

The criterion is that the refrigerant system shall withstand pressures up to 300 psig and not leak more than 4 ounces per year.

2.3.3 Method

The system was charged with a mixture of dry nitrogen and refrigerant to the specified 300 psig pressure. A General Electric type H leak detector was used to measure the total leakage rates of the entire system.

2.3.4 Results

No significant refrigerant leaks were detected on the air conditioner (SN59303).

2.3.5 Analysis

The air conditioner met the criteria of the refrigerant pressure and leak test.

2.4 HIGH TEMPERATURE STORAGE AND OPERATIONAL TEST

2.4.1 Objective

The objective was to determine if the test item could be stored and operated under high temperature conditions without detrimental effects.

2.4.2 Criteria

The criteria are:

- a. The test item shall be capable of withstanding storage conditions (+155°F).
- b. The test item shall deliver satisfactory performance at +120°F for conformance with hot-dry conditions outlined in AR 705-15, C1.

2.4.3 Method

The generator set was serviced for the high temperature exposure. The entire test unit was subjected to a +155°F environment for 4 hours following stabilization at +155°F. Following the storage phase the chamber temperature was decreased to +120°F and the test unit inspected for any detrimental effects. The unit then was subjected to a +120°F environment and after stabilization, power was applied to the air conditioner. The unit was checked in each mode of operation with the ducts attached. During each mode of operation the performance of the unit was determined by observations and monitoring of refrigerant pressures and pertinent temperatures. The operational test included at least 1 hour of operation in the maximum Cool mode. The unit was then turned off for 15 minutes and then again operated in the cooling mode.

2.4.4 Results

The results on the air conditioner (SN69303) are given in Table 2.4-1.

Table 2.4-1. High Temperature Storage at +155°F and Operational Test at +120°F

| Condition | Results Recorded |
|--|----------------------|
| Inspection after +155°F storage | No defects recorded. |
| Initial start up at +120°F | |
| Start | Yes |
| Generator operate satisfactorily | Yes |
| Air conditioner - vent | |
| Average inlet temp, °F | +115 |
| Average outlet temp, °F | +115 |
| Air conditioner - max cool | |
| Suction pressure, psig | 58 |
| Discharge pressure, psig | 225 |
| After 1 hour of operation | |
| Air conditioner - max cool | |
| Average inlet temp, °F | +116 |
| Average outlet temp, °F | + 87 |
| After stop and 15 minute down period | |
| Start | Yes |
| Generator operate satisfactorily | Yes |
| Air conditioner operate satisfactorily | Yes |

2.4.5 Analysis

The air conditioner met the criteria of the high temperature storage and operational test.

2.5 DURABILITY, MAINTAINABILITY, AND RELIABILITY TEST

2.5.1 Objectives

The objectives were:

- a. To determine if the trailer mounted air conditioner will exhibit durable and reliable operation for an extended period.
- b. To determine if maintenance and servicing as required can be performed without difficulty on the trailer mounted unit.

2.5.2 Criteria

The criteria are that the test item:

- a. Shall operate for not less than 3000 hours without failure or malfunctioning and without requiring services or maintenance other than scheduled maintenance. Durability test time in this case will be dependent upon the reliability test time.
- b. Shall have a mission reliability of 95% for a mission duration of 24 hours at a 90% confidence level.
- c. Shall be easy to service and maintain without the need of special tools, using the procedures outlined in the maintenance literature.

2.5.3 Method

The air conditioner was connected to a heated inclosure with the flexible ducts. The test was conducted in 24-hour missions which consisted of cyclic operation of the unit in the maximum cooling mode.

A sufficient number of missions were run in order to determine reliability. For the reliability determination a MBTF of 468 hours was used for the following test schedule, Table 2.5-1:

Table 2.5-1. Test Schedule

| <u>Test Time, hrs</u> | <u>Allowable Failures</u> |
|-----------------------|---------------------------|
| 1078 | 0 |
| 1821 | 1 |
| 2490 | 2 |

The operational characteristics of the unit were monitored periodically to note any deterioration of performance. The operational characteristics included refrigerant pressures, air temperatures at evaporator intake and discharge, and sight glass indication.

Throughout the program a record was maintained of successful starts, failures to start, services or maintenance performed which included time before stoppage, identification of service, time to repair (whether scheduled or unscheduled), and any other difficulty encountered.

Any service or maintenance performed was performed in accordance with the instructions outlined in the maintenance literature and the adequacy of the instructions noted.

2.5.4 Results

The unit operated for 1120 hours with one mission-aborting failure. This failure was due to improper operation of the code A magneto, and caused the unit (SN89301) to fail to start. The magneto failure was due to improper contact points gap adjustment. The points were not adjustable on the code A magneto (only one of the three units tested had this type of magneto). The operational characteristics as monitored during the test are given in Table 2.5-II.

Table 2.5-II. Operational Characteristics, Averaged Data

| Engine hours | Sight Glass | Suction Pressure, psig | Discharge Pressure, psig | Evaporator Inlet Temperature, °F | Evaporator Outlet Temperature, °F |
|-----------------|----------------|------------------------------|--------------------------------|---|--|
| 0 to 50 | Clear | 23 | 79 | +72 | +47 |
| 1050 to 1100 | Clear | 32 | 75 | +91 | +54 |

^aNo significant change between 50 and 1050 hours.

Table 2.5-III gives the durability failures that occurred during the testing. Table 2.5-IV gives the data recorded for use in calculating the reliability, mean time between failure, mean time to repair, and availability. The test was terminated (par. 1.4) at 1120 hours. The demonstrated reliability was 0.92 for a 24-hour mission time at the 90% confidence level.

No special tools were required for maintenance. The units were easy to service and maintain using the procedures outlined in the maintenance literature.

Table 2.5-III. Durability Failures

| Failure | Repair Operation | Time to Repair, hrs |
|--|--|---------------------|
| Exhaust pipe clamp fracture | Replace clamp | 0.33 |
| Oil filter bracket fractured | None | . |
| Center support bracket fracture | None | . |
| Muffler bracket fracture and exhaust pipe threads stripped | Replace muffler and bracket | 0.5 |
| Frequency converter failed | Replace converter | 0.75 |
| Throwing oil | Replace governor and oil breather valve | 1.91 |
| Failure to start | Replace magneto | 3.0 |

Table 2.5-IV. Reliability, MTBF, MTTR, and Availability Data^a

| Operation | Air Conditioner | | |
|--|-------------------|----------------|----------------|
| | SN69301 | SN69303 | SN69302 |
| Successful starts | 107 | 10 | 5 |
| Failures to start | One | None | None |
| Successful operating hours | 1120 | 10 | 5.5 |
| Stoppage failures | One | None | None |
| Approximate time to fix failures (hours) | 3.0 | None | None |
| Unscheduled maintenance (hours) | ^b 6.49 | ^b 0 | ^b 0 |
| Scheduled maintenance (total hours; No. of times per- formed). | | | |
| Daily preventive maintenance | | | |
| Engine - generator | 9.5; 55 | 0.35; 2 | 0.17; 1 |
| Air conditioner | 11; 55 | 0.41; 2 | 0.20; 1 |
| Quarterly preventive main- tenance | | | |
| Engine - generator | 2.67; 4 | 0; 0 | 0; 0 |
| Air conditioner | 1; 4 | 0; 0 | 0; 0 |
| Lubrication | | | |
| Engine - generator | 3.8; 23 | 0.33; 2 | 0.167; 1 |
| Air conditioner | ∓ | ∓ | ∓ |

^aIncomplete data due to test termination (par. 1.4).^bSee Table 2.5-III.

2.5.5 Analysis

The air conditioner failed to meet the durability criteria of this subtest. No determination could be made on the reliability and maintainability criteria of this subtest because the test was terminated before the number of hours required to fully evaluate the results was accumulated.

The code A magneto failure was considered a deficiency because the unit failed to operate. Because the failure was due to improper contact points gap, and the points could not be adjusted, this failure could be corrected by using a magneto with adjustable point gap.

The first five durability failures listed in Table 2.5-III were considered shortcomings because the unit was operational, but the failures would have to be corrected to increase the efficiency and to render the equipment completely serviceable. The fractures of the exhaust pipe clamp, oil filter bracket, center support bracket, and muffler bracket and the exhaust pipe stripped threads were caused by excessive vibration. The failure of the frequency converter either was caused by excessive vibration or was a random failure. The converter was not disassembled to determine the cause and further testing could not be completed due to test termination.

The oil being thrown out of the engine, requiring replacement of the governor and oil breather valve, was due to a manufacturer's defect in the size of the oil hole in the governor and for this reason was considered a random failure.

2.6 RADIO INTERFERENCE SUPPRESSION TEST

2.6.1 Objective

The objective was to determine if the air conditioners were properly suppressed to satisfy the criteria requirement.

2.6.2 Criteria

The criteria are that:

- a. The conducted and radiated emissions of the test unit shall not exceed the broadband limits specified in MIL-STD-461A, Table A-1 for tactical noncommunication electronic equipment.
- b. The conducted and radiated emissions of the test unit shall not exceed the broadband limits specified in MIL-E-55301 for tactical noncommunication electronic equipment.

2.6.3 Method

The conducted and radiated emissions of the test unit were determined by the prescribed test method REO-2 and ACE-2 as outlined in MIL-STD 461A. The test unit was tested in accordance with the procedures in MIL-E-55301 for tactical noncommunication electronic equipment in all areas in which it failed to meet the requirements of MIL-STD 461A, Table A-1. The test unit was operated in the cooling mode for all tests.

2.6.4 Results

The radiated and conducted RFI emissions were within the allowable limits specified in MIL-STD-461A, Table A-1, subtests REO-2 and ACE-2.

2.6.5 Analysis

The air conditioner met the criteria of the radio interference suppression test. The unit operated within the limits specified in MIL-STD-461A, Table A-1, for tactical noncommunication electronic equipment. Previous testing has shown that if a unit meets the criteria of MIL-STD-461A, Table A-1, it will meet the criteria of MIL-E-55301. The units are therefore considered to have met the criteria of MIL-E-55301.

SECTION 3. APPENDICES

APPENDIX I - TEST FINDINGS

| Item | Source Test Plan (Reference 1) | Requirements | Applicable Subtest | Remarks |
|------|--------------------------------------|---|-----------------------|--|
| 1 | Par. 2.2 | The units shall be received with all components and they shall be properly mounted. | 2.1 | Not met. All three units were received with the improper technical manuals. One unit was received without a fire extinguisher, and two units were missing fasteners. See analysis, par. 2.1.5. |
| 2 | Par. 2.3 | The unit shall have a removable control panel located on the condenser blower section and shall contain a four-position selector switch and thermostat. | 2.2 | Met. See analysis, par. 2.2.5. |
| 3 | Par. 2.3 | The thermostat shall have a range of +60°F (or less) to +90°F (or more). | 2.2 | Not met. The thermostat ranges were 62°F through 91°F, 60.5°F through 91°F, and 64°F through 94°F on the three units tested. See analysis, par. 2.2.5. |
| 4 | Par. 2.3 | The unit shall contain a high-pressure cut out switch in the compressor discharge line to turn the compressor and condenser fan motor off when the condenser pressure reaches 280 psig. The switch shall have a reset switch located at | 2.2 | Not met. On one unit the switch cut out at 250 psig until properly adjusted. See analysis, par. 2.2.5. |

| Item | Source Test Plan (Reference 1) | Requirements | Applicable Subtest | Remarks |
|------|--------------------------------------|---|-----------------------|--|
| 5 | Par. 2.5 | the rear of the compressor section. The refrigerant system shall withstand pressures up to 300 psig and not leak more than 4 ounces per year. | 2.3 | Met. See analysis par. 2.3.5. |
| 6 | Par. 2.7 | The test item shall be capable of withstanding storage conditions (+155°F) and deliver satisfactory performance at +120°F. | 2.4 | Met. See analysis par. 2.4.5. |
| 7 | Par. 2.10 | The unit shall operate for at least 1078 hours without failure or malfunctioning and without requiring service or maintenance other than scheduled maintenance. | 2.5 | Not met. Excessive vibration caused failures. See analysis par. 2.5.5. |
| 8 | Par. 2.10 | The unit shall have a mission reliability of 95% for a mission duration of 24 hours at a 90% confidence level. | 2.5 | No determination made. See analysis par. 2.5.5. |

| Item | Source Test Plan (Reference 1) | Requirements | Applicable Subtest | Remarks |
|------|--------------------------------------|--|-----------------------|---|
| 9. | Par. 2.10 | The unit shall be easy to service and maintain without need of special tools, using the procedures outlined in the maintenance literature. | 2.5 | No determination made. See analysis par. 2.5.5. |
| 10. | Par. 2.11 | Radiated and conducted emission shall not exceed the allowable limits of MIL-STD-461A, Table A-1, and MIL-E-55301(EL). | 2.6 | Met. See analysis par. 2.6.5. |

APPENDIX II - DEFICIENCIES AND SHORTCOMINGS

1. Deficiencies

| Deficiency | Suggested Corrective Action | Remarks |
|---|---|---------------------------|
| 1.1 One of the three units was received without the required fire extinguisher (par. 2.1.4). | Inspect units for fire extinguishers before issue. | This was a safety hazard. |
| 1.2 The air conditioner failed to start during the durability, maintainability and reliability test (par. 2.5.4). | Replace the code A magneto with a magneto with adjustable points. | Not applicable. |

2. Shortcomings

| Shortcoming | Suggested Corrective Action | Remarks |
|---|---|--|
| 2.1 Excessive vibration during the durability, maintainability, and reliability test caused fractures in the 5 kw generator frame, muffler, and exhaust pipe support brackets (par. 2.5.4). | The center support bracket should be inspected for proper welding. The muffler should be mounted with more rigid support brackets so that its weight will not cause bracket failures. If this is done, the exhaust pipe bracket should not need redesign. | The following failures were caused by vibration. The weld that connects the center support bracket to the frame cross member fractured. The muffler bracket fractured twice. The oil filter bracket fractured around the mounting bolt that attaches the magneto to the engine. The exhaust pipe threads were stripped so they no longer held the exhaust pipe on the muffler. The exhaust pipe bracket fractured. |
| 2.2 Two of the three thermostats tested during the controls and performance test did not have the required range of +60°F to +90°F (par. 2.2.4). | Add inspections for the thermostat range to insure better quality control. | Not applicable. |

| <u>Shortcoming</u> | <u>Suggested Corrective Action</u> | <u>Remarks</u> |
|--|--|--|
| 2.3 The high-pressure cutout switch was improperly adjusted when received (par. 2.2.4). | Inspect for proper setting and adjust if required. | Not applicable. |
| 2.4 The gasoline engine technical manuals received were the improper manuals (par. 2.1.4). | Issue supplements to the technical manuals to update for the new model engine. | Not applicable. |
| 2.5 Fasteners were missing on two of the three units when received (par. 2.1.4). | Inspect for missing fasteners and install new fasteners as required. | Not applicable. |
| 2.6 The frequency converter in the 5 kw generator control panel failed on one unit during the reliability test (par. 2.5.4). | Not applicable. | This failure was due to excess vibration of the unit or was a random failure. The converter was not disassembled to determine the cause, and further testing on other units could not be completed due to test termination (par. 1.4). |

3. Random Failure

| <u>Random Failures</u> | <u>Suggested Corrective Action</u> | <u>Remarks</u> |
|---|--|--|
| 4.1 The engine was throwing oil out of the oil gage rod cap and air cleaner (par. 2.5.4). | Not applicable. | This was due to a manufacturer's defect in the size of the oil hole in the governor. |

APPENDIX III - CORRESPONDENCE



DEPARTMENT OF THE ARMY
HEADQUARTERS U S ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND MARYLAND 21005

15 OCT 1968

AMSME-QE

7-7-0800-03

SUBJECT: Test Directive, Initial Production Test of Air Conditioner,
Trailer Mounted, 18,000 BTU/HR, Electric Motor Powered, 50/60
Cycle, 120/208 Volts, 3-Phase;
Contract DAAG11-68-C-1487, USATECOM Project Number 7-7-
0800-03

Commanding Officer
Aberdeen Proving Ground
ATTN: STEAP-CO-P
Aberdeen Proving Ground, Md. 21005

1. References:

- a. Letter, AMSME-QRT, USAMECOM, 2 October 1968, subject: Request for Time and Cost Estimate for IPT of Air Conditioner, Trailer Mounted, Electric Motor Driven, 18,000 BTU/HR, Contract No. DAAG11-68-C-1487, with four inclosures (Inclosure 1).
- b. Contract DAAG11-68-C-1487, dated 28 June 1968 (Inclosure 2).
- c. Military Specification MIL-A-52568A(ME), dated 3 January 1968, "Air Conditioner: Trailer Mounted, Electric Motor-Driven, 18,000 BTU/HR," (Inclosure 3).
- d. Military Specification MIL-A-11210 E, dated 18 August 1966, "Air Conditioners: Base Mounted, Self-Contained, Multipackage-Type, Air-Cooled, Electric-Motor-Driven, 18,000-BTU/HR," (Inclosure 4).

2. Background:

- a. The subject air conditioner is being procured under contract DAAG11-68-C-1487, a copy of which is inclosed (Inclosure 2).
- b. The applicable test specifications are Military Specification MIL-A-52568A(ME), paragraph 4.4.2, and MIL-A-11210 E, paragraph 4.4, table II, column 4. Copies of these specifications are inclosed (Inclosures 3 and 4).

AMSTE-GE

15 OCT 1968

7-7-0800-03

SUBJECT: Test Directive. Initial Production Test of Air Conditioner, Trailer Mounted, 18,000 BTU/HR, Electric Motor Powered, 50/60 Cycle, 120/208 Volts, 3-Phase;
Contract DAAG11-68-C-1487, USATECOM Project Number 7-7-0800-03

c. Reference 1a requests a time and cost estimate for the subject test and also authorizes testing to proceed upon the arrival of proper funding and the test items.

d. No previous USATECOM tests have been accomplished on the subject air conditioner.

e. The contractor has previously produced the 18,000 BTU/HR air conditioner on another contract, but is a first-time producer of the trailer mounted unit.

f. Systems with which the subject air conditioner is used are:

- (1) AN/GRC-26 Radio Set.
- (2) AN/MCC-6 Telegraph, Telephone Terminal.
- (3) AN/MSC-29 Terminal, Telegraph Repair Shop
- (4) Repair Shop, Instrument Repair Shop, Truck Mounted
- (5) AN/MRC-29 Radio Relay Terminal Set

3. Description of Materiel: The subject test will be accomplished on two air conditioners having the following characteristics:

a. Mechanical: Multipackaged, trailer mounted, 18,000 BTU/HR, 800 CFM, electric motor driven, with flexible ducts and duct retainer rack.

b. Electrical: Drive motor, 50/60 cycle, 120/208 volts, 3-phase, powered by military design generator set, 5 KW, 60 cycle, GED, mounted on same trailer.

4. Test Objectives: The overall objectives of the subject test are to determine if the subject air conditioner conforms to the purchase requirements and if it is suitable for issue for Army use under the intent of AMCR 700-34, dated 3 April 1967.

5. Responsibilities: Aberdeen Proving Ground will perform the subject test upon receipt of the test items and proper funding from USAMECOM. Aberdeen Proving Ground will forward a time and cost estimate to this headquarters for approval and submittal to USAMECOM. This time and

AMSTE-GE

15 OCT 1968

7-7-0800-03

SUBJECT: Test Directive, Initial Production Test of Air Conditioner,
Trailer Mounted, 18,000 BTU/HR, Electric Motor Powered, 50/60
Cycle, 120/208 Volts, 3-Phase;
Contract DAAG11-68-C-1487, USATECOM Project Number 7-7-
0800-03

cost estimate will include a detailed plan of test, with all subtests listed by noun name and any necessary explanation of pass/fail criteria included.

6. Coordination: Direct coordination is authorized between the requesting agency (USAMECOM) and Aberdeen Proving Ground. It is requested that this headquarters be apprised of any pertinent changes or agreements and be furnished information copies of correspondence. The cognizant person at USAMECOM is Mr. D. Fulk, Autovon 693, extension 2146. The contact at USAMERDC is Mr. R. Hursey, Autovon 851-1450, extension 45163.

7. Special Instructions:

a. Project Number. USATECOM project number 7-7-0800-03 is assigned to this task. The STE form 1028 for this task is inclosed (Inclosure 5).

b. Priority. A test priority of 2 (SEA) is assigned to this task.

c. Test Item Delivery Date. Two test air conditioners are expected by September 1969. As part of the direct coordination authorized, APG will arrange with USAMECOM the shipping and disposition addresses and instructions necessary.

d. Maintenance Package. Appropriate specific comments will be made by equipment performance reports on the adequacy of the maintenance package furnished with the test items, including technical manuals, repair parts complements, and special tools, if any.

e. Reliability and Maintainability. The following factors, as a minimum, will be recorded in order to provide empirical numerical values for reliability, mean time between failure (MTBF), mean time to repair (MTTR), and availability:

- (1) Successful starts.
- (2) Failures to start.
- (3) Successful operating hours.
- (4) Stoppage failures.
- (5) Approximate time to fix failures in hours.

AMSTE-GE

15 OCT 1968

7-7-0800-03

SUBJECT: Test Directive, Initial Production Test of Air Conditioner,
Trailer Mounted, 18,000 BTU/HR, Electric Motor Powered, 50/60
Cycle, 120/208 Volts, 3-Phase;
Contract DAAG11-68-C-1497, USATECOM Project Number 7-7-
0800-03

- (6) Unscheduled maintenance hours.
- (7) Scheduled maintenance hours.
- (8) Difficulty in performing maintenance operations, scheduled or unscheduled.

These data will be kept on not only those test items specifically intended for durability runs, but on all test items which are operated.

f. Transient Vibration and Road Test. The subject air conditioner, with its generator set power source, is already mounted on a 2-wheel trailer; therefore, actual Munson road tests appear to be practical in lieu of laboratory vibration simulations. If, for any reason, laboratory vibration tests must be done on components of the assemblage, Interim Pamphlet 70-73 of TECP 700-700, 8 March 1967, will be used as the laboratory vibration standard.

g. Suitability for Issue under AMCR 700-34. Aberdeen Proving Ground will submit recommendations as to suitability of the air conditioner for issue and the rationale for the recommendation to this headquarters.

h. For purposes of the reliability portion of this test, a general definition of a failure will be that found in Military Standard 721B, 25 August 1966. Failures will be recorded without regard to the discrepancies being later classified as either a deficiency or a shortcoming. Random failures only will be used in the calculation of reliability as opposed to repeated failures for a known design shortcoming. For maintainability, aside from the normal factors of MTR and maintenance ratio, subjective statements on acceptability for maintenance and general level of difficulty will be useful. Deficient areas found in previous testing will be commented on as to the corrective action taken and whether or not such measures are adequate.

i. An analysis of maintenance operations is desired on the subject air conditioner because it is a first time entry into USATECOM testing. This analysis will be limited to maintenance operations made necessary by failures or the necessity for adjustments. No teardowns will be made specifically for maintenance analysis purposes, although comments are expected on obvious difficulties if such operations are performed.

AMSTE-GE

15 OCT 1968

7-7-0800-03

SUBJECT: Test Directive, Initial Production Test of Air Conditioner,
Trailer Mounted, 18,000 BTU/HR, Electric Motor Powered, 50/60
Cycle, 120/208 Volts, 3-Phase;
Contract DAAG11-68-C-1487, USATECOM Project Number 7-7-
0800-03

8. Test Plans and Reports:

a. The plan of test for the subject item will be in sufficient detail to allow USATECOM to determine to its satisfaction that all desired test objectives will be met. Those tests deemed necessary to provide a statement of suitability for issue under AMCR 700-34 will be included. The plan of test is to be forwarded to this headquarters for approval on or before 1 April 1969.

b. Format of Reports. Test reports will be prepared in accordance with USATECOM Regulation 705-2, 28 February 1966, and equipment performance reports (EPR) with USATECOM Regulation 705-4, 18 December 1967. The final report will be in the form of a letter report. The recommendation for suitability for issue under AMCR 700-34 will be in a separate letter.

c. Equipment Performance Report and Final Letter Report Distribution. Aberdeen Proving Ground will submit EPR and final letter reports in the following quantities after approval of the letter report by this headquarters. A copy of the USATECOM suitability for issue action letter will be attached to each report:

| | <u>Final Report</u> | <u>EPR</u> |
|--|---------------------|------------|
| CG, USAMC, ATTN: AMOMR | 2 | |
| CG, USAMC, ATTN: AMOMA-VS | 1 | |
| CG, USAMC, ATTN: AMCFM-MEP | 2 | |
| CG, USATECOM, ATTN: AMSICE-QRT | 6 | 6 |
| CO, USAMERDC, ATTN: SMEFB-CO | 4 | 4 |
| USA, Chicago Procurement Agency, ATTN: AMXCH-PR, 623 S. Wabash Ave., Chicago, Ill. 60605 | | 1 |
| Defense Documentation Center | 20 | |
| Dir, MEP FO | 2 | |
| Pres, USAARENEO, ATTN: STEEB-EN-E | 1 | |

Submit two copies of each EPR to Headquarters, USATECOM, as well as ten copies of the final letter report for USATECOM approval action.

AMSTE-GE

15 OCT 1968

7-7-0800-03

SUBJECT: Test Directive, Initial Production Test of Air Conditioner,
Trailer Mounted, 18,000 BTU/HR. Electric Motor Powered, 50/60
Cycle, 120/208 Volts, 3-Phase;
Contract DAAG11-68-C-1487, USATECOM Project Number 7-7-
0800-03

d. A message interim report will be rendered to this headquarters, upon completion of operational testing, summarizing completed tests and whether satisfactory or unsatisfactory results were obtained from each test. This report is expected within one week after testing is completed.

9. Safety: Routine safety procedures for this class of equipment will be followed. Any unsafe or potentially unsafe conditions will be reported in detail. There are no known safety hazards in the design of the subject set.

10. Security: The subject test program is unclassified.

FOR THE COMMANDER:

5 Incl *u/l*
as

Guillen D. Bolter
QUILLLEN D. BOLTER
Colonel, GS
Dir, GE Mat Test Dir

Copies furnished (w/o incl):

CG, USAMC, ATTN: AMCMR
CG, USAMC, ATTN: AMCFM-MEP
CG, USAMC, ATTN: AMOMA-VS
CG, USAMECOM, ATTN: AMSME-QRT
CO, USAMERDC, ATTN: SNEFB-CO
CO, AFG, ATTN: STEAP-MT-TF
Dir, MEP FO, ATTN: AMCFM-MEP-FO-S
Pres, USAAREMBD, ATTN: STEBB-EN-E



DEPARTMENT OF THE ARMY
HEADQUARTERS U S ARMY TEST AND EVALUATION COMMAND Mal Kiser/pms/
ABERDEEN PROVING GROUND, MARYLAND 21005 234-3350-4994

S: 2 June 1970

AMSTE-GE

21 APR 1970

SUBJECT: Initial Production Test of Air Conditioner, 18,000 BTU/HR,
Electric Motor Driven, Contract No. DAAG-11-68-C-
1487, USATECOM Project No. 7-EG-175-018-003
(7-7-0800-03)

Commanding Officer
Aberdeen Proving Ground
ATTN: STEAP-MT-D
Aberdeen Proving Ground, MD 21005

1. References:

a. Letter, AMSME-QRT, USAMECOM, 10 April 1970, subject:
Air Conditioner, 18,000 BTU/HR, Trailer Mounted, USATECOM
Project No. 7-EG-175-018-003, Contract No. DAAG-11-68-C-
1487 (Inclosure 1).

b. USATECOM Regulation 70-24, 1 July 1969.

2. By inclosure 1, US Army Mobility Equipment Command requested that subject initial production test be terminated as of this date (10 April 1970) and that test units be returned to Granite City Army Depot.

3. Aberdeen Proving Ground is directed to terminate subject initial production test effective this date and forward the formal final report to this headquarters, ATTN: AMSTE-GE, as soon as possible, but not later than 2 June 1970.

4. The final report will be prepared in accordance with USATECOM Regulation 70-24, dated 1 July 1969. Initial production test reports will not include statements concerning suitability of items for release but does not preclude inclusion of other recommendations. Statements concerning suitability of an item for release and other pertinent statements may be included in transmittal letters which forward test reports to this headquarters.

AMSTE-GE

21 APR 1971

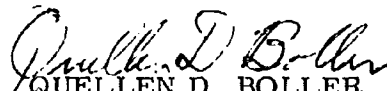
SUBJECT: Initial Production Test of Air Conditioner, 18,000 BTU/HR,
Electric Motor Driven, Contract No. DAAG-11-68-C-
1487, USATECOM Project No. 7-EG-175-018-003
(7-7-0800-03)

5. Aberdeen Proving Ground will ship subject test units to Granite City Army Depot as requested by paragraph 2 of basic letter (Inclosure 1). Test items will be shipped as soon as possible. Mr. Don Fulk, AMSME-QRT, Autovon 693-2145, should be notified by telephone upon shipment of test items.

6. STE Form 1189, reflecting test cancellation and report schedule into TRMS, is inclosed (Inclosure 2).

FOR THE COMMANDER:

2 Incls
as *u/d*


QUELLEN D. BOLLER
Colonel, GS
Dir, GE Mat Test Dir

Copies Furnished (w/o incls):

CG, USACDC, ATTN: USACDC LNO (USATECOM)

CG, USAMC, ATTN: AMCRD-J

CG, USMC, ATTN: USMC LNO (USATECOM)

CG, USAMECOM, ATTN: AMSME-QRT

CO, APG, ATTN: STEAP-MT-RF (w/Incl 2 only)



DEPARTMENT OF THE ARMY
U S ARMY MOBILITY EQUIPMENT COMMAND
4300 GOODFELLOW BOULEVARD
ST LOUIS, MISSOURI 63120

Mr. Fulk/lp/693-2145

AMSME-QRT

SUBJECT: Air Conditioner, 18,000 BTU/HR, Trailer Mounted, USATECOM
Project No. 7-EG-175-018-003, Contract No. DAAG-11-
68-C-1487

Commanding General
U. S. Army Test and Evaluation Command
ATTN: AMSME-GE (Major Kiser)
Aberdeen Proving Ground, Maryland 21005

1. References:

a. Letter, AMSME-GE, dated 5 March 1970, subj: Approved Change No. 1 to Test Plan: Initial Production Test of Air Conditioner, Trailer Mounted, 18,000 BTU/HR, Electric Motor Driven, USATECOM Project No. 7-EG-175-018-003 (7-7-0800-03).

b. Telephone conversation between Major Kiser, TECOM, and Mr. Fulk, MECOM, 23 March 1970, subject as above.

2. This confirms referenced telephone conversation that IPT for subject items is requested to be terminated as of this date, and that test units be returned to Granite City Army Depot. These trailer mounted Air Conditioners were procured to satisfy RVN requirements. A review of the use and distribution of trailer mounted 18,000 BTU Air Conditioners in RVN has disclosed that shipments to that theater have greatly exceeded all valid requirements for this equipment.

3. There is an urgent need for five stack, Electric Motor Driven, 18,000 BTU Air Conditioner. It has been determined that these three, two stack units will be disassembled and reconfigured into five stack assemblies.

4. Request we be advised when cancellation of subject test has been initiated.

FOR THE COMMANDER:

M. A. RUMFORD
M. A. RUMFORD
C, Reliability Engr & Test Div
Directorate of Product Assurance

III-9

(Following Page Blank)

APPENDIX IV - REFERENCES

1. Test Plan For Initial Production Test of Air Conditioner, Trailer Mounted, 18,000 BTU/HR, Electric Motor Driven, June 1969, with Change 1, 5 March 1970.
2. Letter, STEAP-DS-TF, 28 November 1966, Letter Report No. DPS-2222-(L) for Engineer Design Test of Air Conditioner, Trailer Mounted, Generator-Set-Powered, 18,000 BTU/HR; USATECOM Project No. 7-7-0801-01.
3. Letter, STEAP-MT-TF, 21 March 1969, Final Letter Report of Product Improvement Test of Air Conditioner, Trailer-Mounted, Generator-Set-Powered, 18,000 BTU/HR.

APPENDIX V - ABBREVIATIONS

| | |
|----------|--|
| AR | = Army Regulation |
| AMCR | = Army Materiel Command Regulation |
| Btu | = British thermal unit |
| cfm | = cubic feet per minute |
| °F | = degrees Fahrenheit |
| EMD | = electric motor driven |
| GED | = gasoline engine driven |
| hr | = hour |
| kw | = kilowatt |
| max | = maximum |
| MIL | = Military (as in specifications) |
| MIL-STD | = Military Standard |
| MTBF | = mean time between failures |
| MTTR | = mean time to repair |
| psig | = pounds per square inch, gage |
| RFI | = radio frequency interference |
| SN | = serial number |
| temp | = temperature |
| TM | = technical manual |
| TRL MTD | = trailer mounted |
| USAMECOM | = United States Army Mobility Equipment Command |
| USATECOM | = United States Army Test and Evaluation Command |

APPENDIX VI - DISTRIBUTION LIST

USATECOM Project No. 7-EG-175-018-003

| <u>Addressee</u> | <u>Final Report</u> |
|---|---------------------|
| Commanding General US Army Test and Evaluation Command Aberdeen Proving Ground, Maryland 21005 ATTN: AMSTE-GE | 37 |
| Commanding General US Army Materiel Command Washington, D. C. 20315 ATTN: AMCRD-J | 2* |
| AMCRD-R | 1 |
| AMCRD-U | 1* |
| AMCMA-VS | 1 |
| AMCQA-E | 1 |
| AMCRP | 2* |
| AMCSF | 1 |
| Commanding General US Army Combat Developments Command Aberdeen Proving Ground, Maryland 21005 ATTN: USACDC LNO (USATECOM) | 23* |
| Commanding General US Continental Army Command Fort Monroe, Virginia 23351 ATTN: ATIT-RD-MD | 4* |
| Commanding General US Army Mobility Equipment Command 4300 Goodfellow Boulevard St. Louis, Missouri 63120 ATTN: AMSME-QRT | 3* 5 |
| Chief of Research and Development Department of the Army Washington, D. C. 20310 ATTN: CRDME-1 | 7 |
| CRDPE-S | 1 |

Distribution denoted by an asterisk () will be furnished from those copies forwarded to Headquarters, USATECOM.

| <u>Addressee</u> | <u>Final Report</u> |
|---|---------------------|
| Assistant Chief of Staff for Force Development Department of the Army Systems Staff Officer (DASSO) Washington, D. C. 20310 | 1 |
| Commanding Officer US Army Mobility Equipment Research and Development Center Fort Belvoir, Virginia 22060 ATTN: SMEFB-RDE-O | 4 |
| Commanding Officer US Army Logistics, Doctrine Systems and Readiness Agency New Cumberland Depot P.O. Box 2947 Harrisburg, Pennsylvania 17105 ATTN: DCSLOG-LDSRA-ME | 1 |
| President US Army Maintenance Board Fort Knox, Kentucky 40121 | 1 |
| US Marine Corps Liaison Officer HQ, USATECOM Aberdeen Proving Ground, Maryland 21005 | 1 |
| Commander HQ, Defense Documentation Center for Science and Technical Information Cameron Station Alexandria, Virginia 22314 ATTN: Document Service Center | 20 |

Secondary distribution is controlled by US Army Mobility Equipment Command,
ATTN: AMSME-QRT.

USATECOM PROJECT NO. 7-EG-175-018-003
FINAL REPORT ON INITIAL PRODUCTION TEST OF
AIR CONDITIONER, TRAILER MOUNTED, 18,000 BTU
PER HOUR, ELECTRIC MOTOR DRIVEN, 50/60-CYCLE,
120/208-VOLT, 3-PHASE

Report No. APG-MT-3592

CODE SHEET

Code A - Slick, Slick Electro Co., Rackford Illinois.

(This code sheet is to be removed from this report when loaned or otherwise distributed outside the Department of Defense.)

FOR OFFICIAL USE ONLY

Unclassified

Security Classification

| DOCUMENT CONTROL DATA - R & D | | |
|---|--|--|
| <i>(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)</i> | | |
| 1. ORIGINATING ACTIVITY (Corporate author) Materiel Testing Directorate Aberdeen Proving Ground, Maryland 21005 | | 3a. REPORT SECURITY CLASSIFICATION For Official Use Only (With Code Sheet) 3b. GROUP |
| 2. REPORT TITLE INITIAL PRODUCTION TEST OF AIR CONDITIONER, TRAILER MOUNTED, 18,000 BTU/HR, ELECTRIC MOTOR DRIVEN, 50/60-CYCLE 120/208-VOLT, 3-PHASE | | |
| 4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Final Report 16 January through 22 April 1970 | | |
| 5. AUTHOR(S) (First name, middle initial, last name) Robert O. Rice | | |
| 6. REPORT DATE June 1970 | 7a. TOTAL NO. OF PAGES 38 | 7b. NO. OF REFS 3 |
| 8a. CONTRACT OR GRANT NO. Not Applicable 8b. PROJECT NO. USATECOM Project No. 7-EG-175-018-003 8c. | 9a. ORIGINATOR'S REPORT NUMBER(S) APG-MT-3592 9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) | |
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| 11. SUPPLEMENTARY NOTES None | 12. SPONSORING MILITARY ACTIVITY USAMECOM | |
| 13. ABSTRACT The initial production test of the 18,000 British thermal units per hour trailer mounted air conditioner was conducted at Aberdeen Proving Ground, Maryland, from 16 January through 22 April 1970 to determine the ability of the test items to withstand environmental, transportation, durability, capacity, and radio interference suppression tests. The test was terminated by the United States Army Test and Evaluation Command before all testing was completed. The tests started or completed before termination were the initial inspection and servicing test; the control and performance test; the refrigerant pressure and leak test; the high temperature storage and operational test; the durability, maintainability and reliability test; and the radio interference suppression test. The results on the completed tests showed two deficiencies, six shortcomings, and one random failure. One deficiency was that one of the units was received without a fire extinguisher. The other deficiency was a failure to start due to the failure of the code A magneto. The shortcomings were: the excessive vibration of the units, the inadequate range of two thermostats, the improperly-adjusted high-pressure cutout switch, the improper engine technical manuals received with the units, missing fasteners, and the failure of one generator frequency converter. The random failure was the failure of an engine governor. | | |

DD FORM 1473

REPLACES DD FORM 1473, 1 JAN 64, WHICH IS
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| 14 | KEY WORDS | LINK A | | LINK B | | LINK C | |
|----|--|--------|----|--------|----|--------|----|
| | | ROLE | WT | ROLE | WT | ROLE | WT |
| | Air conditioner, 18,000 Btu per hour Air conditioner, trailer mounted Air conditioner, electric motor driven | | | | | | |

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